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STUDIES IN THE GENUS *MICRANDRA* I THE RELATIONSHIP OF THE GENUS *CUNURIA* TO *MICRANDRA*

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IN connection with a study of the genus *Hevea*, it has been found advisable to carry out investigations in genera which are believed to be related to that of the commercial rubber plant. Some of the results of this collateral research were published in 1947, when Baldwin and Schultes summarized (Bot. Mus. Leafl. Harvard Univ. 12 (1947) 325-364) and brought up to date our knowledge of the genus *Cunuria*. Since 1947, field studies and taxonomic investigations of *Hevea*, *Cunuria* and *Micrandra* have been continued. The following notes are necessitated by our better understanding of the relationships of the last two groups of plants and are herein presented in preparation for a monographic treatment of *Micrandra*.

Micrandra was described by Bentham in 1854 (in Hooker's Journ. Bot. 6 (1854) 371). It is conserved over *Micrandra* R. Brown (in Bennett Pl. Jav. Rar. (1844) 237). The type species was *Micrandra siphonioides* Bentham from the Rio Uaupés in the upper Rio Negro basin

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of Brazil. *Cunuria* was described by Baillon in 1864. The type species of *Cunuria* was *C. Spruceana* Baillon from the uppermost reaches of the Río Negro and from the Río Casiquiare in Venezuela.

Cunuria has been separated from *Micrandra* in the past by the following characters:

<i>Cunuria</i>	<i>Micrandra</i>
Calyx deeply cup-shaped	Calyx open, rather shallowly bowl-shaped
Sepals strongly imbricate	Sepals imbricate or valvate
Staminate disk absent	Staminate disk glandular, five-lobed
Pistillate disk cup-shaped, glandular-lobate or absent	Pistillate disk annular and thin
Stamens ten	Stamens five to seven
Seeds ecarunculate	Seeds carunculate
Leaves entirely glabrous	Leaves usually variously pilose beneath

Field studies and collections of hundreds of individuals of various species of *Cunuria* and *Micrandra* made in 1947-1948 in the upper Río Negro basin of Brazil and Colombia suggested the possibility that these two hitherto apparently well-defined genera might represent but a single concept. Critical examination of a portion of the ample material collected during these field studies, especially of the collections of the new species *Micrandra Lopezii* and *M. Rossiana* herein described, and abundant flowering material of what has been known as *Cunuria crassipes*, indicates that there is definitely but one genus, since the characters hitherto used to separate the two concepts break down and overlap. It becomes necessary, therefore, to transfer the recognized concepts of *Cunuria* to *Micrandra*.

***Micrandra australis* (R. E. Schult.) R. E. Schultes**
comb. nov.

Cunuria australis R. E. Schultes ex Baldwin & Schultes

in Bot. Mus. Leaf. Harvard Univ. 12 (1947) 333, t. 42.

Micrandra glabra (*R. E. Schult.*) *R. E. Schultes*
comb. nov.

Cunuria glabra *R. E. Schultes* ex Baldwin & Schultes
in Bot. Mus. Leaf. Harvard Univ. 12 (1947) 339, t. 44.

Micrandra glabra, described from material collected
in British and Dutch Guiana, has recently been found
in southern Venezuela.

VENEZUELA: State of Bolívar, Ptari-tepuí, lower south-facing slopes,
between Río Karuai and first ridge above Río Karuai. Alt. 1220 m.
“Tree 100 feet tall. Fruit edible. Leaves coriaceous, deep green
above, pale green below. *Suru-wai-yek*.” November 28, 1944, *Julian*
A. Steyermark 60,689.

Micrandra Gleasoniana (*Croiz.*) *R. E. Schultes*
comb. nov.

Cunuria Gleasoniana Croizat in Bull. Torr. Bot. Club
57 (1940) 289.

In 1947, Baldwin and Schultes (*loc. cit.* 348) stated:
“The presence of a definite caruncle on the seed of this
concept renders its inclusion in *Cunuria* untenable.” At
that time, however, no transfer was made, even though
it was recognized that all concepts which fell into the
then apparently clear-cut genus *Micrandra* were carun-
culate and that all which could be included in *Cunuria*
were without this structure on the seed. Baldwin and
Schultes, therefore, considered the presence or absence
of a caruncle to be a character of value in distinguishing
between the two genera, although former students of
these groups had not mentioned the caruncle. Studies
of additional material and the discovery of two new spe-
cies, however, indicate that, like all other characters once
used to separate *Cunuria* from *Micrandra*, the presence
or absence of a caruncle is not stable.

The presence of leaf pubescence was not known in the

concepts formerly accommodated in the genus *Cunuria*, whereas a tendency towards some form of pilosity on the under surface of the leaf was in evidence in most of the species hitherto included in *Micrandra*. The concept described by Croizat as *Cunuria Gleasoniana* has a thick, soft indument on the entire under surface of the leaf. This character, alone, would have suggested that the concept should represent a *Micrandra*.

***Micrandra Lopezii* R. E. Schultes sp. nov.**

Arbor monoecia, usque ad 65 pedes alta (sed vulgo minor), usque ad 10–12 poll. in diametro (maxima pro parte multo minor), columnaris, vulgo sine radicibus tabularibus; tenuissimo cum cortice cinereo vel in partibus altioribus brunneo, 2–3 mm. crasso; succo pro genere copioso lacteo albo. Folia valdissime coriacea, perfecte ovata vel elliptico-rotundata, reclinata, nervum centralem versus angulo 120° plicata, omnino glaberrima, in specimine typico statu adulto 13–25 cm. longa, 10–15 cm. lata (maxima pro parte majora), apice valde rotundata, basi cordata, valde marginata, supra glauco-atroviridia (siccitate fusco-straminea), infra pallidiora; venis secundariis 12–14, in sicco stramineis, subtus non elevatis, superficie inferiore valde elevatis, arcuato-adscendentibus, sub marginem ipsum tenuiter anastomosantibus, tertiis prominentioribus reticulatis, subparallelis. Petiolus crassus, siccitate striato-fibrosus, 3–7 cm. longus, 2–3 mm. in diametro; glandulis comparate magnis. Inflorescentiae apicales, dense glomeratae, pedicellis brevissimis, complanatis, crassis, adpresso-tomentellis, vulgo cum flore terminali pistillato magno latere utroque cum floribus duobus vel tribus lateralibus minutis staminiferis omnibus in bracteis ovatis caducis septis cincto. Flores pallide luteo-virides vel flavi, leviter aromatici. Flores pistillati calycis laciniis quinque, imbricatis, carnosos-

crassissimis, elongato-ovatis, 7 mm. longis, 3 mm. latis, omnino dense et minute albo-tomentellis. Discus hypogynus, cupuliformis, glanduloso-lobatus, lobis longe triangulari-subulatis, 0.8 mm. ad 1 mm. longis, flavis. Ovarium ovoideum, in circuitu aliquid trigonum, 1.2–1.8 mm. in diametro, glabrum; stylus subsessilis, niger, carnosus, tripartitus cum divisionibus bifidis, reflexis, 1.2 mm. longis, supra glabris, subtus dense albo-tomentellis. Flores staminiferi multo minores, 1.3 mm. in diametro, semper ad florem pistillatum stricte adpressi et itaque valde deformati; calycis laciniae illis florum pistillatorum similes sed minores. Discus nullus. Stamina sex ad novem, valde minuta, usque ad 0.8 ad 1 mm. longa vel saepe breviora, valde deflexa, filamentis liberis inaequalibus et antheris aliquid pyramidalibus. Fructus ellipsoideus, atroviridis, apice rotundatus, leviter trisulcatus, vivo 33 mm. \times 28 mm., siccitate 28 mm. \times 24 mm., epicarpio glabro, 2–3 mm. crasso; valvis partientibus non contortis; pedunculo probabiliter robustiore. Semina adhuc ignota sed probabiliter pro genere parva.

BRAZIL: Estado do Amazonas, Rio Uaupés, at base of Serra Tukano (on right bank below mouth of Rio Tikié). "Small tree, columnar and not buttressed, 45 feet tall, 7–10 inches in diameter. Leaves heavily leathery, marginate, folded at 120° angle along midrib. Bark grey or brownish red above, hard and brittle, thin, checked; internally red. Flowers white, odorless. Latex thick, white, sticky, not coagulating easily. In caatinga-forest." February 8, 1948, *Richard Evans Schultes & Francisco López 9725* (TYPE in Herb. Gray).—Same locality. "Small tree in caatinga-forest. Columnar, not buttressed, 50 ft. tall, diameter 8 inches. Bark checked, grey or reddish brown above, hard, thin, peeling from cambium freely; red internally. Leaves coriaceous, marginate, folded along midrib forming an angle of 120° . Latex thick, white, sticky, not coagulating easily, relatively abundant. Growing very abundantly together with *Hevea nitida* and *H. pauciflora*. Wood white, relatively hard." November 7, 1947, *Richard Evans Schultes & João Murça Pires 8999*.—Same locality and date. "Columnar tree 65 ft. tall, diameter 10–12 inches, not buttressed. Latex fairly abundant, white, sticky, not coagulating easily. Bark smooth, reddish brown outside, red inside, thin. Leaves coriaceous, marginate, folded

along midrib, reclinate." *Richard Evans Schultes & João Murça Pires 9000*.—Same locality. January 30, 1948, *Richard Evans Schultes & Francisco López 9663, 9664*.—Estado do Amazonas, Rio Uaupés, Ipanoré. February 2, 1948, *Richard Evans Schultes & Francisco López 9666, 9667, 9669*.

Micrandra Lopezii appears to approach most closely to *M. glabra*, a tree of savannas or caatingas in British and Dutch Guiana. Whereas the latter is a corpulent, heavily buttressed tree, the former is a slender tree devoid of buttresses (except in the *forma* described below). The leaves of *Micrandra glabra* tend, in general, to be somewhat smaller than those of *M. Lopezii*, and they also seem to have had in life a waxy glaucescence on the upper surface, a character not present in *M. Lopezii*. The fruit of *Micrandra Lopezii* is much smaller (33×28 mm.) than that of *M. glabra* ($55-60$ mm. $\times 30$ mm.), and the capsule of the former is perfectly rounded at the apex, whereas that of the latter tends to be somewhat tapering. The staminate flowers of *Micrandra Lopezii* are very minute, only 1.3 mm. in diameter, much smaller than those of *M. glabra*; and the pistillate flowers, while of about the same size, have differentiating characters in the disk. *Micrandra Lopezii* has an extremely dense and contracted axillary inflorescence, whereas that of *M. glabra* is lax with rigid pedicels and is subapical.

Micrandra Lopezii is an inhabitant of the caatinga-forest formation of the upper Rio Negro basin. Its similarity to *Micrandra glabra* emphasizes once more the phytogeographical relationship of the upper Rio Negro with the Venezuelan-Guianan land mass. We might justifiably infer, from its relationships and the isolated occurrence of *Micrandra Lopezii* near bases of ancient remnant mountains, that this species represents one of the most ancient elements of the genus.

Be that as it may, there is no doubt that *Micrandra*

Lopezii stands entirely alone as the most primitive member of the genus. Examination of ample material has disclosed the most extraordinary lack of differentiation which, combined with other factors of morphology and phytogeography, I can interpret to mean only that we are confronted with the most primitive species yet known in the group.

Usually, in *Micrandra*, the large terminal flower is pistillate, whereas the smaller laterally placed flowers are staminate. Furthermore, any condition suggestive of a perfect flower in this group of plants has been completely unknown.

The curious structure of the densely glomerate inflorescence in *Micrandra Lopezii* is matched in significance only by the unexpected lack of differentiation of the flowers. The large terminal flower is usually pistillate, but may be staminate; rather frequently, it is found to be perfect, with anthers full of pollen grains, which would suggest that the flower is functionally as well as morphologically perfect. From six to nine stamens may be present. There are, likewise, transitions from perfect to purely pistillate terminal flowers. The anomalous formation of the stamen-filaments is probably significant, emphasizing in a striking manner the lack of differentiation of floral parts. Some of the filaments seem to arise from the disk, while a few appear to grow from within the disk and a few from without this structure. In some of the transitions from perfect to pistillate flowers, these "filaments" lack anthers and, were their position on the disk constant, could be taken for long, subulate lobes of this structure.

The large terminal flower is flanked by several (usually two or three) smaller flowers. As in the terminal flower, these laterals may be pistillate or even perfect, although they usually are staminate. There may even be

additional buds at the base of these smaller, lateral flowers, but they seem rarely to develop. It is obvious from this condition that, however densely glomerate it may appear to be, the inflorescence of *Micrandra Lopezii* is of indeterminate growth. These lateral flanking flowers so tightly enclasp the larger terminal flower that they are flattened and distorted. They may be of unequal size and are enclosed in large, ovate, caducous bracts.

The staminate flowers are variable both in size and in number of stamens. The usual number seems to be eight, but a variation from six to nine exists. The staminate flowers usually have a hairy, lobate disk.

This extraordinary display of protean versatility on the part of the flowers of *Micrandra Lopezii* may be of much deeper significance than we can now understand. The genera of the *Euphorbiaceae* are usually well defined and stable. The discovery of such an apparent lack of differentiation in generic characters is indeed unexpected.

On a basis of most of its characters, the concept here described as *Micrandra Lopezii* would have been accommodated by the genus *Cunuria*. The species, however, has two characters which would have thrown it into *Micrandra* as formerly delineated. The presence of a disk in the staminate flower and the low and inconstant number of stamens are "micrandroid" characters; whereas *Cunuria* was, in great measure, based upon an absence of a staminate disk and a constant presence of ten stamens. Therefore, since *Micrandra Lopezii* is intermediate between *Cunuria* and *Micrandra* as formerly understood, it can be taken as a partial basis for the reduction to synonymy of *Cunuria* herein proposed.

This most unusual tree I am dedicating to the late Francisco López who first discovered it and recognized it as a "different" *cunurí*. "Pacho" López was born in La Pedrera in the Colombian Amazonia in 1927 and died

in Bogotá on July 6, 1949. During his five years as assistant collector with me, his work, always cheerful, enthusiastic and loyal, added much to our knowledge of the Amazon flora of his country.

In November 1947, Murça Pires, López and I went up the Rio Uaupés to investigate the caatinga flora at Ipanoré, Spruce's type locality [“Panuré”], of *Hevea rigidifolia* and many other remarkable endemics. On this trip, our attention was arrested one day by the sudden appearance on the right bank of a small, bald granitic mountain (Serra Tukano), a few kilometers in from the bank, near the almost-abandoned settlement of Bela Vista, about midway between the mouth of the Rio Tikié and the confluence of the Rios Uaupés and Negro. Knowing that such mountains are often repositories of botanical treasures, we stopped and began to slash our way through the forest towards the base of the mountain. Near the base we emerged into a most beautiful and fascinating caatinga-forest. While Murça Pires began to collect the general flora, López and I concentrated on *Hevea* and *Micrandra*. We were hoping for some interesting individuals of these laticiferous trees, but we were not prepared for the pleasant surprise which was in store. Rapid scouting of the caatinga convinced us that we were in an almost pure stand of a slender, columnar and unbuttressed species of *Micrandra*. The curious, dry, thickly coriaceous leaves of the tree, which had first commanded our attention, thickly covered the floor of the caatinga where they are strewn each year. Walking over them causes a very sharp crunch because of the thickness of the carpet.

Careful search showed that no trees were in flower. One individual in sporadic and probably abnormal fruit was collected. On our return in late November, we revisited the locality, making a more detailed, but unsuc-

cessful search. In late January, however, López and I again penetrated to the base of Serra Tukano and were rewarded with flowering material. It happened to be the height of the flowering period, and a century set was made of one tree which was abundantly blossoming. It is significant to note in passing that, although the flowers of *Micrandra Lopezii* have no odor perceptible to man, the trees, when in blossom, are frequented by literally thousands of large, black, stinging bees or wasps. Although we felled trees to collect material, the persistence of these insects made the task extremely unpleasant.

In February, we found *Micrandra Lopezii* in the caatinga at Ipanoré, farther upstream from Serra Tukano.

***Micrandra Lopezii* forma *anteridifera* R. E. Schultes forma nova.**

Arbor usque ad septuaginta pedes alta, a *Micrandra Lopezii* trunco 18 poll. in diametro ad basim radicibus tabularibus late hebetato-rotundatis crassis sed non extensis usque ad quattuor pedes altis armato, cortice grossiuscule squamoso et foliis paulo coriaceoribus differt.

BRAZIL: Estado do Amazonas, Río Curicuriari, at base of Serra Cujubí. "Flowers yellow. Tree 70 feet tall, $1\frac{1}{2}$ ft. in diameter, columnar above, slight rounded buttresses up to 4 feet. Bark very thick ($\frac{1}{2}$ inch), reddish inside, reddish brown outside, rather shaggy, soft, peeling easily. Crown small. Leaves highly coriaceous, marginate, folded along midrib at a right angle. Latex sparse, thick, white, sticky, not coagulating well." January 22, 1948, *Richard Evans Schultes & Francisco López 9637* (TYPE in Herb. Gray); 9638.

Micrandra Lopezii forma *anteridifera* differs from *M. Lopezii* in having low, bluntly rounded buttress-roots up to a height of about four feet and in having a much thicker bark which is very coarsely shaggy. These two characters are extremely constant in the colony of trees at the base of Serra Cujubí, where we examined more than eighty individuals. The lack of any slight indication

of buttressing is equally as constant in *Micrandra Lopezii*, for at least 175 individuals were examined in the two localities known for the plant without our finding a single buttressed individual. Special attention was devoted to this study, since buttressing is such a fundamental character in *Micrandra*. The rounded, thick nature of the buttresses of *Micrandra Lopezii* forma *anteridifera* is unlike that in any other concept of the genus. Buttresses in *Micrandra* are either usually rather thin and sharp, extending outwards from the trunk enormously (as in *M. Spruceana*) or becoming stilt-like (as in *M. crassipes*). The epithet *anteridifera* refers to the presence of buttress-roots on this form of *Micrandra Lopezii*.

Our trip to the headwaters of the Rio Curicuriarí was made expressly to study the representatives of *Hevea* and *Micrandra* in that most fascinating of rivers. We continued upstream as far as the Serra Cujubí, a small mountain located not far southeast of Serra Tukano, partly to ascertain if *Micrandra Lopezii* crossed over from the Uaupés to the Curicuriarí drainage-area by way of these granitic hills and their attendant caatinga-forests. It is, I think, highly significant that the new species and its form should be so restricted to the Uaupés and upper Curicuriarí. One whole year in the upper Rio Negro basin failed to uncover other localities for the *M. Lopezii* concept. There can be little doubt but that other localities (the concept is always found in small, isolated colonies) do exist, but we may venture to say that they are not numerous and are not far from the focus comprised between the Uaupés and the Curicuriarí.

***Micrandra Rossiana* R. E. Schultes sp. nov.**

Arbor monoecia, usque ad septuaginta pedes alta (saepe multo minor), usque ad decem vel duodecim pollices in diametro; truncus erectus et columnaris, sine

radicibus tabularibus, cum cortice laevi, tenui, mollissimo, extus flavo-fulvo, intus subalbido; succo sparsissimo lacteo-albo. Folia firme chartacea vel subcoriacea, statu juvenili elliptica, statu adulto 12–24 (plerumque plusminusve 14) cm. longa, 6–11 (plerumque 6.5) cm. lata, margine integra, leviter et inconspicue marginata, apice abrupte apiculata, basi vulgo late cuneata vel raro subrotundata, longe petiolata (petiolo 2–4.5 cm. longo, 1–2 mm. in diametro, laminae junctionem versus carnosodilatato et biglanduloso, glandulis nigris), vivo supra atroviridia, nitida, venis potius elevatis stramineis, subtus pallidiora, venis omnibus stramineis valdissime elevatis, in nervorum centralium et secundariorum angulo axillari dense albido- vel stramineo-pilosa. Inflorescentiae axillares, rigidae, pauciflorae, plerumque 6–10 cm. longae, rhachide obscure et irregulariter cinereo-pulverulenta, cortice rufo. Bracteae flores subtendentes acuto-subulatae, 2 mm. longae, dense pulverulentae; bracteolae similes, multo minores. Flores pistillati comparate magni, apice usque ad 9 mm. in diametro, flavi, calyces 6 mm. longi, extus minute pilosi, apicem versus dense albido-pulverulenti, intus dense pilosi pilis retrorsis, laciniis ovatis, apice rotundatis, margine integris, carnosus, 4 mm. longis, 3 mm. latis; discus hypogynus, parvus, annularis, margine sanguineus, ad ovarium adnatus, intus cum sex ad decem projectionibus minutissimis (0.3 ad 0.5 mm. longis) aliquando capitatis quasi staminodiis, albis (staminibus rudimentariis?); ovarium late pyramidali-ovoideum, 3.5 mm. altum, basi 2.5 mm. in diametro, densissime pilosum; stylus subsessilis, tripartitus cum divisionibus bifidis, crassus, reflexus. Flores staminales in alabastro subglobosi, minuti, circiter 1–1.5 mm. in diametro; calyce florum pistillatorum simili sed minore et laciniis haud aperientibus; stamina octo, quinque cum filamentis longis (0.8 mm.) et tria cum filamentis brevibus (0.3 mm.),

omnibus congesto-deflexis, antheris comparate magnis, circiter 0.6 mm. longis; ovarii rudimentum conspicuum, dense villosum; discus nullus. Fructus conspicue ellipsoideus, vivo plusminusve 4 cm. longus, 2–2.2 cm. in diametro, siccitate haud minor, apice rotundato-obtusius, basi aliquid indentatus, in circuitu suborbicularis, epicarpio nitido, atroviridi sed maturitate flavescenti, magnopere tenuissimo (vivo saepissime quam 0.8 mm. minore), endocarpio lignoso, tenui (usque ad 1.2 mm. crasso), valvis regularibus, 2.5 cm. longis, 6 mm. latis; pedunculo vulgo longissimo, gracili, usque ad 5.5 cm. longo, 1–1.2 mm. in diametro. Semina carunculata (caruncula magna, 4–4.5 mm. lata), testa rufo-brunnea, in circuitu longitudinali ovalis, 22 mm. longa, 12 mm. lata, valde compressa, 8 mm. crassa, in circuitu transversali inaequaliter rhomboidea, superficiebus duabus ventralibus conspicuis, carina dorsali conspicua.

BRAZIL: Estado do Amazonas, Rio Uaupés, between Ipanoré and confluence with Rio Negro, Igarapé da Chuva, Taraquá. "Medium-sized tree, 70 ft. tall. Columnar, 10–12 inches diameter, not buttressed. Latex very scant, thick, white. Bark smooth, thin, soft, externally yellowish, internally white. Flowers yellow. Fruits ripening yellow. Leaves chartaceous." November 12, 1947, *Richard Evans Schultes & João Murça Pires 9058* (TYPE in Herb. Gray).—Estado do Amazonas, Rio Amazonas, Tonantins. "Mata da terra firme ao longo d'um riachinho. Árvore grande. Flôr crême. Latex escasso." February 10, 1944, *Adolpho Ducke 1560*.—Estado do Amazonas, Rio Uaupés, Igarapé da Chuva, Taracua. "Tree 70–75 feet tall, 18 inches in diameter; trunk columnar, without buttresses. Bark thin, $\frac{1}{2}$ cm. peeling easily from the cambium, externally perfectly smooth, yellowish, inside whitish, soft. Latex extremely sparse, white. Crown rather extensive, spreading. Leaves chartaceous, not folded along midrib. Flowers cream-white, odorless. Tukano name: *bõ-wá-puch*. Fruit ripens yellow from tip to petiole, subtriangular in cross section, ellipsoid, valves coming together with definite ridge or keel-effect, apex strong obtuse often even indented, base strongly indented; epicarp smooth, glabrous, very thin (0.25 mm.)." November 12, 1947, *Richard Evans Schultes & João Murça Pires 9048*.—Same locality and date. "Tree 60–70 feet tall, columnar, 1 foot in diameter. Bark thin, soft, smooth, externally yellowish, internally white. Latex white, extremely thick

and unusually sparse, coagulating easily to relatively elastic gum. No buttressed roots. Growing in light forest on white sand near rills. *Arara-seringa*." *Richard Evans Schultes & João Murça Pires 9050*.—Same locality and date. "Columnar, non-buttressed tree 65-75 feet tall, 1 foot in diameter. Bark thin, soft, outside light yellowish tan, inside white. Latex very sparse, white, thick. *Arara-seringa da terra firme*." *Richard Evans Schultes & João Murça Pires 9064*.—Same locality and date. "Árvore de 15 m.; tronco cilíndrico, sapopema muito pequena; casca externa marrom clara com leve escamação; latex escasso; flôr branca na ponta dos galhos. Vive na caatinga juntamente com *Cunuria Spruceana*, *C. crassipes*, *Eperua purpurea*, *E. leucantha*, *Monopteryx Uauçu* etc." *João Murça Pires 971*.—Same locality. "Fruit green, turning yellow. Columnar tree with yellowish, smooth, thin bark. Latex sparse, white." February 3-6, 1948, *Richard Evans Schultes & Francisco López 9681*.—Same locality and date. "Columnar tree 70 ft. tall. Latex thick, white, sparse. Flowers yellow." *Richard Evans Schultes & Francisco López 9693*.—Same locality and date. "Latex white, sparse. Crown heavy. Flowers whitish cream. Columnar tree 60 ft. tall." *Richard Evans Schultes & Francisco López 9694*.—Same locality and date. "Columnar, unbuttressed tree 70 ft. tall. Bark smooth, yellowish. Latex white. Fruit green. *Arara-seringa*." *Richard Evans Schultes & Francisco López 9695*.—Rio Taraira basin, headwaters of Igarapé Abiú. July 7, 1948, *Richard Evans Schultes 10199A*.

COLOMBIA: Comisaría del Vaupés, vicinity of Montfort Mission, Río Papurí. Alt. about 200 m. "Slender, infrequent trees averaging 25-30 m. in height and 50 cm. in diameter. Trunk not buttressed. Bark grey, thin and hard, and difficult to tap. Latex very scanty, coagulating to a gummy, non-elastic mass. Small, trispermate capsules, resembling those of *arara-seringa*, *Micrandra siphonioides*, but considerably elongated. Not well known, one or two individuals hesitatingly called them either *mahawakpuh* or *buhwawakpuh*, but it is doubtful if either would be generally recognized as applicable to this species." August 28, 1948, *Paul H. Allen 3109*.—Comisaría del Vaupés, Río Negro, San Felipe (opposite San Carlos, below Guainía-Casiquiare confluence). "Columnar tree about 60 feet tall. Bark rather yellow-brown, thin, smooth. Latex thick, white, sparse. No buttresses. In light caatinga-forest." June 1948, *Richard Evans Schultes & Francisco López 10034*.—Comisaría del Vaupés, Río Taraira, above lowest rapids. July 11, 1948, *Richard Evans Schultes 10203A*.

VENEZUELA: Territorio del Amazonas, Río Negro, San Carlos. "Corpulent tree, columnar, 70 feet tall, in light caatinga-forest near brooklet. Bark smooth, tawny brown or yellow. Latex not abundant, white." *Richard Evans Schultes & Francisco López 10033*.

My good friends, the Rev. Mr. and Mrs. William Arlie Ross have devoted their almost limitless energies and enthusiasm for over fifteen years to educational and missionary work amongst the poor inhabitants of the upper Rio Negro. Their home and school, located at Jucabí at the mouth of the Rio Curicuriarí, has always been open to travellers and scientists. In gratitude for their kindnesses and help during my explorations in 1947-48 and in respect for their self-sacrificing spirit, I have taken the liberty of naming this most extraordinary tree in their honor.

Several years ago, I prepared a manuscript synopsis of the genus *Micrandra* as known from the then available herbarium material, which was not extensive. Because of pending field work which offered an opportunity of visiting the type localities of several of the concepts, this manuscript was not published. During the preparation of the synopsis, I examined specimens of *Ducke 1560*, which had been filed in our herbaria as *Micrandra siphonioides* Benth. Impressed with the clear differences between the capsule of *Ducke 1560* and that of true *Micrandra siphonioides*, I drew up a description of the *Ducke* collection as an undescribed species of *Micrandra* and annotated the sheets with a new binomial referring to the elongate shape of the fruit. There were also differences in the leaves, and these differences enabled me to annotate the sterile collection *Allen 3109* with the same name. There was never the slightest doubt in my mind that the specimens belonged in the genus *Micrandra*, even though flowering material was not available.

During my year's sojourn in the upper Rio Negro basin in 1947-48, it was possible to collect, from several widely separated localities, very abundant material of this concept in flower and in fruit. I happened upon the first tree by noticing the very coriaceous leaves scattered

on the floor of the forest in great abundance. An investigation showed that the tree was of medium size, with a perfectly columnar, unbuttressed trunk which was covered with a smooth bark of a yellowish hue—all characters unusual indeed in *Cunuria* and *Micrandra* as the genera have hitherto been understood. Flowers and ripened fruit were found on the same tree. A hasty examination in the field indicated that, although there were definite characters of the leaves and fruit which would throw it into *Micrandra*, the external structure of the flowers and the overall appearance of the inflorescence strongly suggested *Cunuria*. Until a recent opportunity of examining the flowers microscopically, I was puzzled as to which genus it rightly belonged. Indeed, even during my field work, I felt that the intermediate position of this concept might perhaps necessitate our reduction of *Cunuria* to synonymy under *Micrandra*.

Detailed microscopic studies of *Micrandra Rossiana* have convinced me that the characters used to separate *Cunuria* from *Micrandra* do not hold. It was this discovery, supported by additional evidence from other species, which led to the reduction proposed in this paper.

The leaf of *Micrandra Rossiana* suggests that of *Micrandra siphonioides* in size, texture and shape. The presence on the under surface of the leaf of dense tufts of hair in the axils of the secondary veins with the central nerve is a character possessed by several species of *Micrandra*, but unknown in *Cunuria*. The capsule, especially its very thin epicarp, would fall into what has been considered *Micrandra* and not into *Cunuria*. The carunculate seed suggests *Micrandra*. The gross structure of the flowers is very definitely "cunurioid," with a deep cup-shaped calyx split into lobes for only about one third of its length, as opposed to the "micrandroid" calyx which is split nearly to the base with the lobes expanded

and retrorse. The other floral characters, however, would agree with *Micrandra* as originally understood: a lobate disk in the staminate flower and a thin annular disk in the pistillate flower. The staminate flower has eight stamens, which is rather intermediate between the two generic concepts.

It is obvious from all of the foregoing considerations that *Micrandra Rossiana* is truly an intermediate concept and that the characters upon which *Cunuria* has rested are unstable.

Micrandra Rossiana appears to be without close allies amongst the known species of the genus.

***Micrandra Spruceana* (Baillon) R. E. Schultes**
comb. nov.

Cunuria Spruceana Baillon in *Adansonia* 4 (1864) 288.

“*Micrandra et Pogonophora ? Cunuri* H. Bn. ol. in exs. Spruce” in *Adansonia* 4 (1864) 288.

Micrandra Cunuri Baillon ex Mueller-Argoviensis in DC. Prodr. 15, pt. 2 (1866) 1123.

Pogonophora Cunuri Baillon ex Mueller-Argoviensis in DC. Prodr. 15, pt. 2 (1866) 1124.

Cunuria bracteosa Ducke in *Notizbl. Bot. Gart. Berlin* 11 (1932) 586, in synonym.; in *Arch. Jard. Bot. Rio Janeiro* 6 (1933) 57.

Cunuria Spruceana Baillon var. *bracteosa* (Ducke) R. E. Schultes ex Baldwin & Schultes in *Bot. Mus. Leaflet. Harvard Univ.* 12 (1947) 345, t. 46.

It is unfortunate that the International Rules of Botanical Nomenclature will not permit the adoption of the binomial *Micrandra Cunuri*, which would have avoided the use in the same genus of the genitive (see below under *M. Sprucei*) and adjectival forms of the same epithet. There is no possibility of taking up *Micrandra Cunuri*, however, and the new combination made above is necessitated.

On the evidence from the collections available in 1947, it seemed advisable to recognize Ducke's *Cunuria bracteosa* as a variety of *Cunuria Spruceana*, although Ducke himself (loc. cit.) had reduced it to synonymy under *C. Spruceana*. Examination of many hundreds of trees in the Rio Negro and its tributaries, the Río Caquetá and the Río Amazonas leads me to conclude that the characters upon which the variety were based are, in general, variations of a seasonal nature. The variety, in consequence, is herewith reduced to synonymy.

Micrandra Sprucei (Muell.-Arg.) R. E. Schultes
comb. nov.

Clusiophyllum Sprucei Mueller-Argoviensis in Flora
57 (1864) 518.

Cunuria crassipes Mueller-Argoviensis in Martius Fl.
Bras. 11, pt. 2 (1874) 510.

In Baldwin and Schultes' treatment of *Cunuria* in 1947, an argument was advanced for the retention of the well established and very descriptive name *C. crassipes* (loc. cit. 338): “. . . *Cunuria crassipes* is being conserved, in conformity with Recommendation XIV of the International Rules of Botanical Nomenclature, over the earlier *Clusiophyllum Sprucei*. Were the indicated combination to be made, a new name would enter into the taxonomic literature. This name would be unfortunate because of its resemblance to *Cunuria Spruceana*, and endless confusion would be the result.”

I had interpreted the wording of Recommendation XIV to permit this action. Since 1947, however, I have had an opportunity of discussing the problem with many American and European colleagues. They are in almost unanimous agreement that the rule of priority should take precedence over the recommendation advising against “the use in the same genus” of the genitive or

adjectival form of the same epithet to designate two different species. In view of this interpretation, I am reluctantly making the indicated new combination. I am certain that only confusion can come from having, in such a small genus, two different species growing in the same geographical area—indeed, sometimes in close association with each other—with the names *Micrandra Spruceana* and *M. Sprucei*. Although the situation created is an absurdity, I am sure that the greatest overall good in systematic botany will result from a strict adherence to the Rules rather than from a surrender to personal preference.

The type collection of *Micrandra Sprucei* did not have abundant flowering material. None of the collections made since Spruce's expedition and cited by Baldwin and Schultes (loc. cit. 336) were in flower. Consequently, the only available description of the floral parts of this species was extremely inadequate. I quote from Pax's treatment in *Pflanzenr.* IV, 147 (1910) 17: "Flores ♂ aperientes ovoidei, 3 mm. longi, in cymulis fere sessiles, tantum pro 2/5 5-fidi." There is no description at all of the pistillate flower.

In the course of my field work in the upper Rio Negro basin, a large number of flowering collections of *Micrandra Sprucei* were made. Additional evidence that the generic characters of *Cunuria* are not stable is provided by the flowers of *Micrandra Sprucei*. The staminate flowers of this species have seven stamens and an extraordinarily distinct glandular-lobate disk which is such a bright scarlet that it may be seen in life through the pale yellow calyx. These are characters formerly attributed to *Micrandra*, while *Cunuria* was based, in great part, upon ten stamens and an absence of the staminate disk. In addition to dried herbarium specimens, abundant material of the inflorescences was preserved in alcohol;

this preservation precluded any alteration of floral parts due to pressing, drying and subsequent boiling in water. The following description of the flowers is based upon the topotypical collection *Schultes & López 9884*:

Inflorescentiae axillares, folia aequantes vel paulo breviores, leviter flexibiles, rhachidibus robustis, usque ad 2.2 mm. in diametro, glabris, flavo-viridibus. Flores pistillati terminales, pallide flavi sed basi sanguinei (propter intus disci colorem naturum pellucidum), cupuliformes, magni, 7 mm. longi, apice late aperientes, 9 mm. in diametro; bracteis caducis, hyalinis, triangularibus, apice acutis, 3 mm. longis, basi 1.6 mm. latis subtenti. Calyx per $\frac{1}{3}$ longitudinis partem quinque-partitus, basi articulatus et in commisura tubuli forma cadentus, lobis valde imbricatis, aliquid carnosiusculis, apice rotundatis, extus maxima pro parte glabris sed apicem versus albidopulverulentis, intus dense albo-tomentellis. Discus hypogynus, quinque-lobatus, lobis glandulosis, vivo sanguineis, maximo 0.6 mm. \times 1.5–1.8 mm., crasso-pulviniformibus, lobis utrisque duobus cum laciniis triangulari-subulatis, usque ad 0.8–1 mm. longis. Ovarium ovoideum, lageniforme, perfecte glabrum, nitidum, 2.5 mm. in diametro, 3 mm. longum; stylus carnosus, rufo-brunneus, tripartitus cum divisionibus bifidis, reflexis, usque ad 1 mm. longis. Flores staminiferi minores, 5–5.5 mm. longi, 3 mm. in diametro, elongato-ovoidei. Calyx non late aperiens, per $\frac{1}{3}$ longitudinis partem quinque-partitus, lobis illis pistillatorum similibus sed apice aliquid cuculliformibus. Stamina septem, tres 3 mm. longa et quattuor 2 mm. longa, apice deflexo, nutantia, filamentis liberis, glabris, 0.4 mm. in diametro, antheris 0.9 mm. longis, 1 mm. latis. Discus quinque-lobatus, lobis glandulosis, vivo sanguineis, majoribus, 0.6 mm. \times 0.9 mm., crasso-pulviniformibus.

VENEZUELA: Territorio del Amazonas, Río Negro, at base of Piedra

del Cocuy. "Tree with small crown; 80 feet tall; columnar; diameter 2 feet. Rather large stilt-buttress roots. Latex thick, white, sparse. Bark thick, $\frac{3}{4}$ inch, rough, externally dark brown, internally reddish, soft. Leaves coriaceous. Flowers yellow-cream, pinkish at base. *Cunurí da caatinga*." May 9, 1948, *Richard Evans Schultes & Francisco López 9884*.

ILLUSTRATIONS

EXPLANATION OF THE ILLUSTRATION

PLATE LXV. MICRANDRA GLEASONIANA (*Croizat*)
R. E. Schultes. Branch, one half natural size;
seed, natural size. Valves of capsule, natural size.

Drawn by GORDON W. DILLON



MICRANDRA

gleasoniana (Croizat) R.E. Schultes



EXPLANATION OF THE ILLUSTRATION

PLATE LXVI. *MICRANDRA LOPEZII* R. E. Schultes.

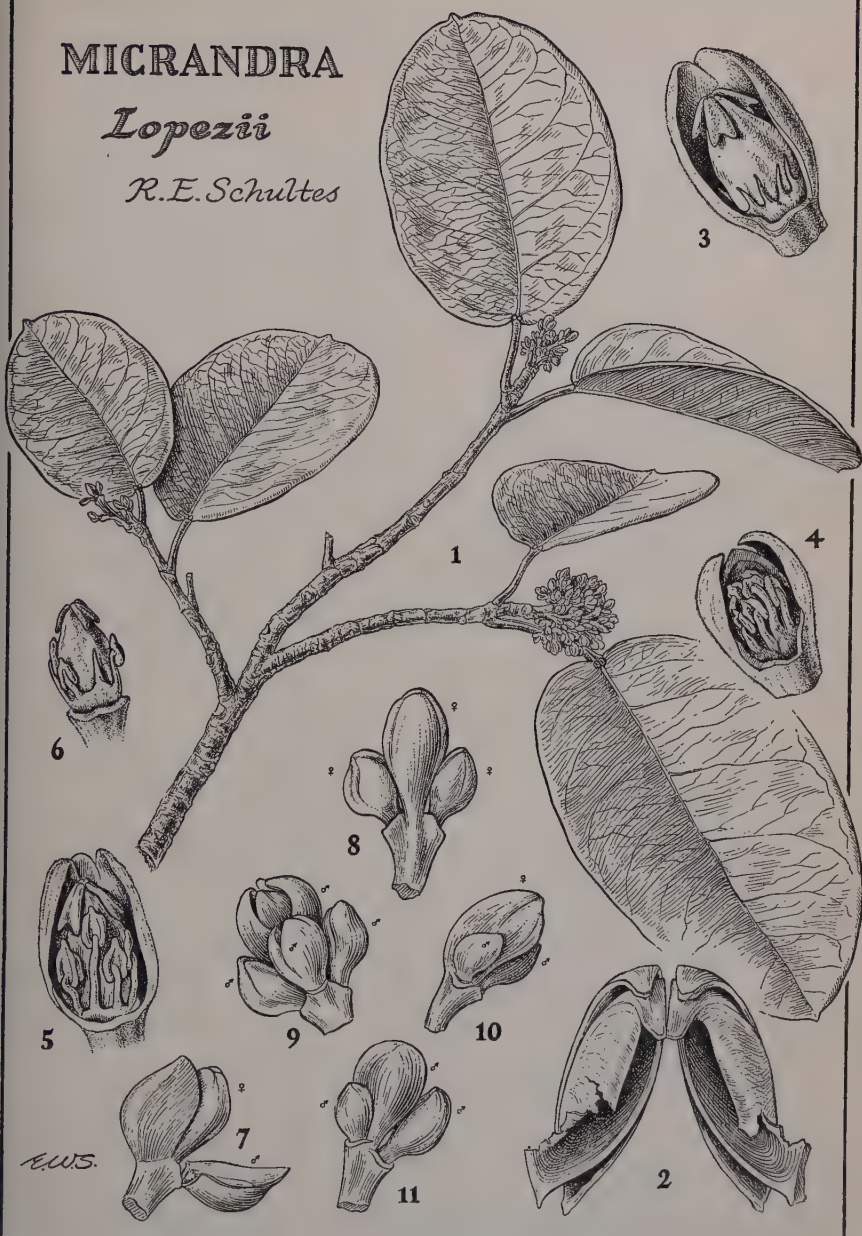
1, flowering branch, one half natural size. 2, valves of capsule, natural size. 3, pistillate flower, partially dissected, five times natural size. 4, staminate flower, partially dissected, five times natural size. 5, flower, with both stamens and pistils partially dissected, five times natural size. 6, same with calyx removed, five times natural size. 7-11, groups of flowers from an inflorescence showing variation in sexual structure, four times natural size.

Drawn by ELMER W. SMITH

MICRANDRA

Lopezii

R.E. Schultes

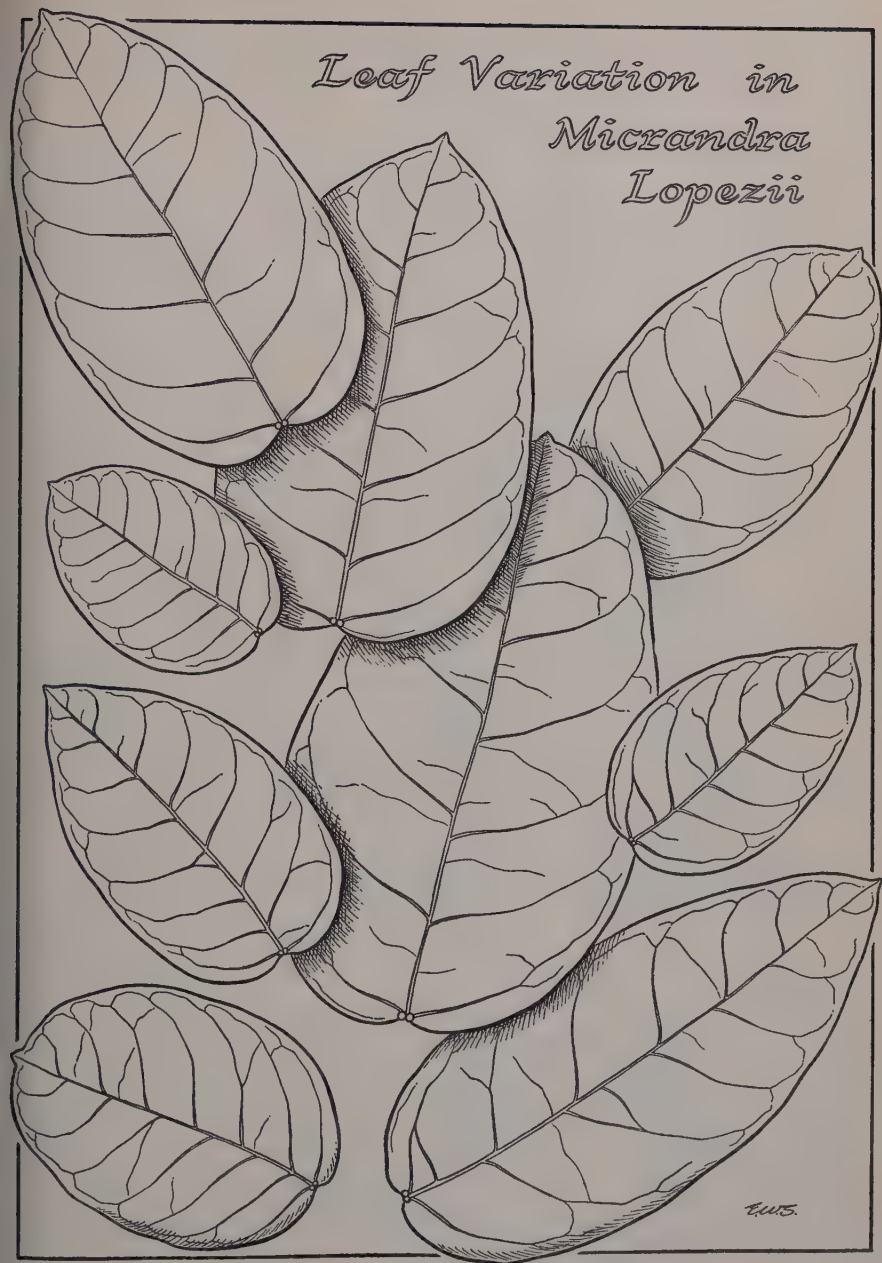


EXPLANATION OF THE ILLUSTRATION

PLATE LXVII. Leaf variation in *MICRANDRA LOPEZII*,
one half natural size.

Drawn by ELMER W. SMITH

*Leaf Variation in
Micrandra
Lopezii*



EXPLANATION OF THE ILLUSTRATION

PLATE LXVIII. MICRANDRA ROSSIANA *R.E.Schultes*.

1, flowering branch, one half natural size. 2, portion of fruiting branch, one half natural size. 3, pistillate flower with part of calyx removed, five times natural size. 4, staminate flower with part of calyx removed, five times natural size. 5, valves of capsule, natural size. 6, seeds, natural size. 7, portion of under surface of leaf showing axillary pilosity, natural size.

Drawn by ELMER W. SMITH

MICRANDRA *Rossiana* R. E. Schultes

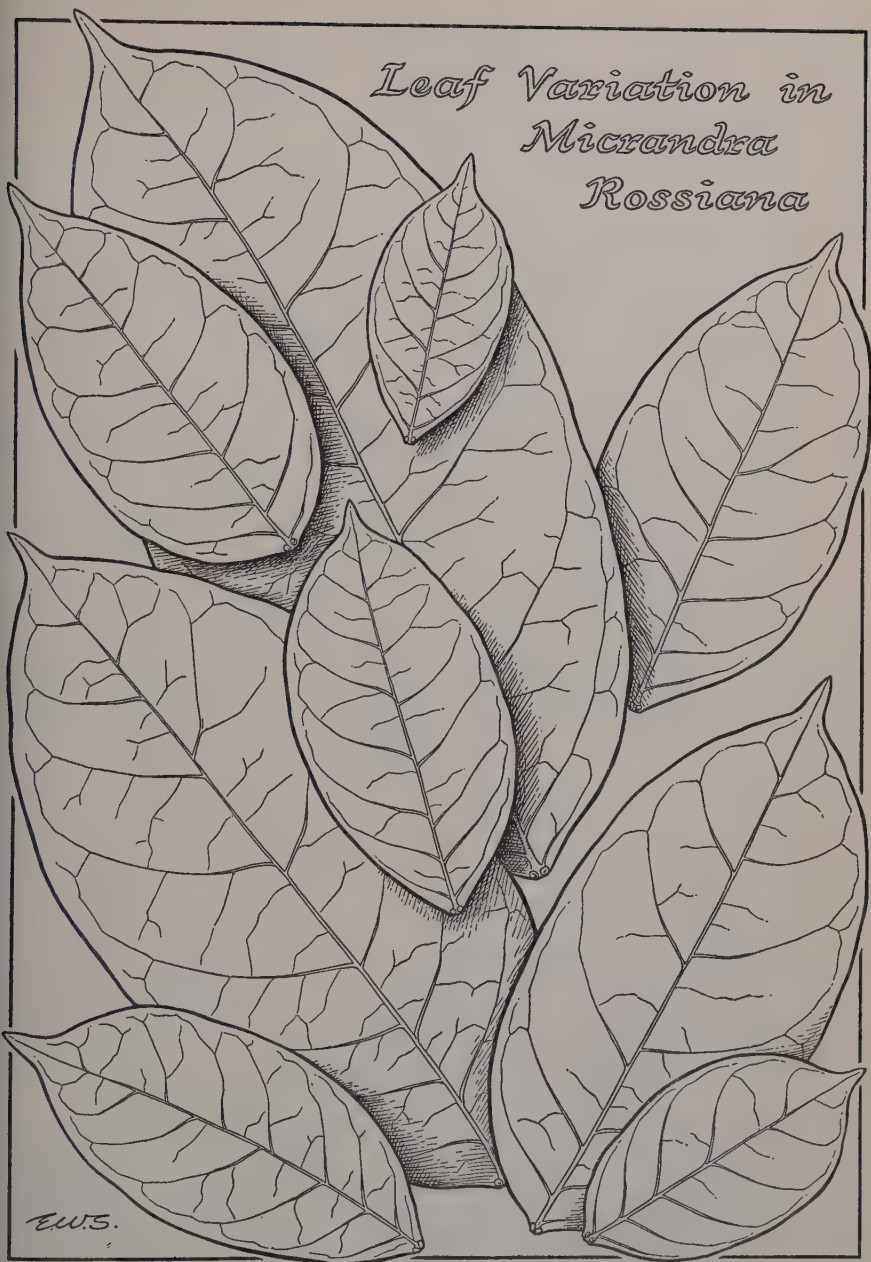


EXPLANATION OF THE ILLUSTRATION

PLATE LXIX. Leaf variation in MICRANDRA ROSSIANA, one half natural size.

Drawn by ELMER W. SMITH

*Leaf Variation in
Micrandra
Rossiana*



EXPLANATION OF THE ILLUSTRATION

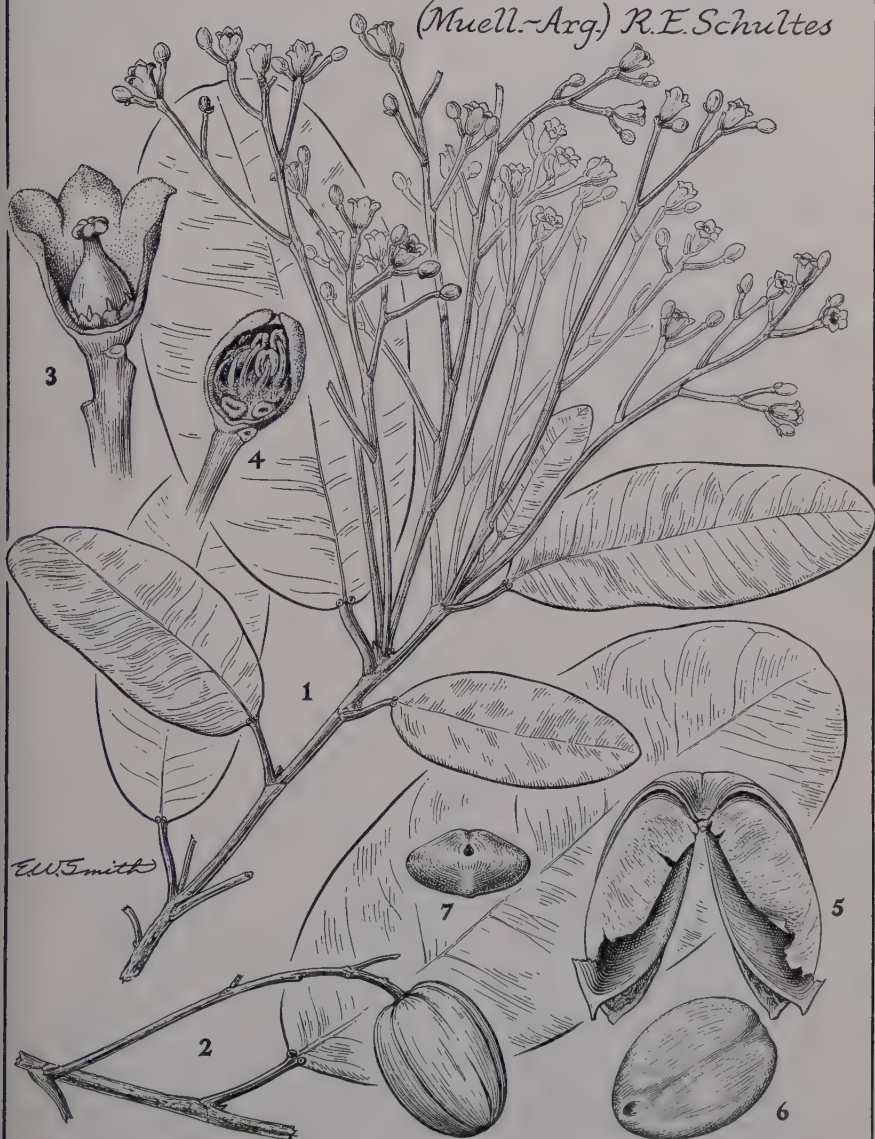
PLATE LXX. MICRANDRA SPRUCEI (*Muell.-Arg.*)
R. E. Schultes. 1, flowering branch, about one half
natural size. 2, portion of fruiting branch, about
one half natural size. 3, pistillate flower with part
of calyx dissected, three times natural size. 4,
staminate flower, with part of calyx dissected,
three times natural size. 5, valves of capsule, nat-
ural size. 6-7, seeds, natural size.

Drawn by ELMER W. SMITH

MICRANDRA

Sprucei

(Muell.-Arg.) R.E. Schultes



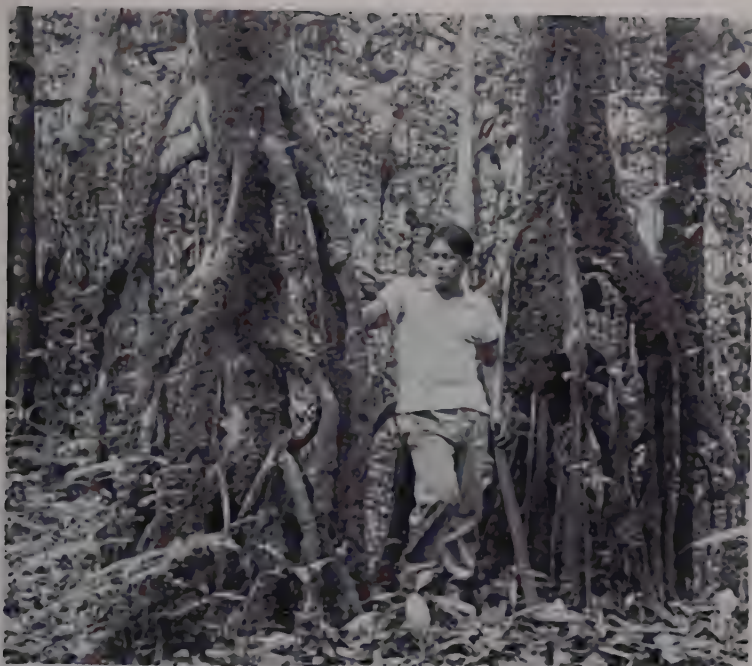
EXPLANATION OF THE ILLUSTRATION

PLATE LXXI. (Upper figure). Photograph of the stilt roots of *MICRANDRA SPRUCEI* (*Muell.-Arg.*) *R. E. Schultes*.

(Lower figure). The trunk of the type tree of *MICRANDRA LOPEZII* *R. E. Schultes* forma *ANTERIDIFERA* *R. E. Schultes* showing the unusual nature of the buttress roots.

Photographs by RICHARD EVANS SCHULTES

PLATE LXXI



EXPLANATION OF THE ILLUSTRATION

PLATE LXXII. Enlarged photograph of the flowers
and the branching of the inflorescence axes of
MICRANDRA SPRUCEI (*Muell.-Arg.*) *R. E. Schultes*.

Photograph by RICHARD EVANS SCHULTES

PLATE LXXII



EXPLANATION OF THE ILLUSTRATION

PLATE LXXIII. Flowering branch of *MICRANDRA*
SPRUCEI (*Muell.-Arg.*) *R. E. Schultes*, showing the
structure of the inflorescence.

Photograph by RICHARD EVANS SCHULTES



EXPLANATION OF THE ILLUSTRATION

PLATE LXXIV. Map showing the known distribution of *MICRANDRA ROSSIANA* *R. E. Schultes*, and *M. LOPEZII* *R. E. Schultes* with its forma *ANTERIDIFERA* *R. E. Schultes*.

Drawn by ELMER W. SMITH

THE KNOWN DISTRIBUTION OF
MICRANDRA ROSSIANA
and
MICRANDRA LOPEZII with
its forma
ANTERIDIFERA

KEY:

A *M. Rossiana*

• M. Lopezii

M. Lopezii forma
anteridifera

